Subject Description Form

Subject Code	**BSE318**
Subject Title	**Lighting Technology**
Credit Value	3
Level	3
Pre-requisite Co-requisite Exclusion	BSE2123 or BSE2130 or equivalent Nil Nil
Objectives	This subject covers a wide range of lighting systems and their applications in illuminating buildings indoors and outdoors. The subject aims at enabling students to identify, analyze and evaluate basic components and features in lighting systems; and then to apply these components appropriately in building lighting design.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. demonstrate an understanding of the parameters to measure light and the visual environment; b. describe the characteristics of light sources and lighting systems, including daylighting systems; c. identify the criteria for the selection of light sources and lighting systems for an indoor or outdoor space; d. perform photometric and colorimetric calculations for lighting design and be able to critically assess the calculated results for practical applications; e. analyze impact of human factors, economy and energy on building lighting design.
Subject Synopsis/ Indicative Syllabus	Lighting quantities and terminology: Quantities for measurement of light and colour: luminous flux, luminous intensity, illuminance, luminance, chromaticity coordinates, tristimulus values, colour matching functions, correlated colour temperature, colour rendering indices. Terminology used in lighting engineering and practice. Light sources and systems: Lamps: incandescent, fluorescent, high intensity discharge and solid-state light sources. Photometric, colorimetric and other lamp characteristics. Ballasts and control gear. Luminaires, optical control and specifications, luminaire photometry. Lighting control systems and energy efficiency. Electrical characteristics, power factor, harmonics. Lighting calculations: Inverse square law, cosine law. Interior lighting design calculations: lumen method, coefficient of utilisation (CU), light loss factors (LLFs); point-by-point calculations; configuration factor; form factor; glare rating calculations. Computer aided lighting design and electronic photometric data file formats. Exterior area lighting calculation. Daylighting: Psychological effects and energy conservation. Daylight availability. Windows and rooflights. Design techniques and calculations. Examples of advanced daylighting systems. Lighting design issues: Design objectives and criteria. Visual performance and comfort. Maintenance of lighting systems. Lighting economics. Energy codes and building environmental assessment. Exterior lighting and light pollution.
Teaching/Learning Methodology	1. Lectures and seminars are to disseminate the theories and concepts of the subject as well as their applications in the practical contexts, which are solidly supported by the discussions and illustrations of deliberately-selected cases and examples – ILO a. to e. 2. Tutorials are to help students digest the knowledge delivered from the lectures and seminars – ILO a. to e. 3. Laboratory work for students to practice lighting measurements and/or to acquire hands-on practical knowledge of lighting system characteristics – ILO a. to e. 4. Simple lighting design exercise or case study assignment to help students understand the lighting design process and practice lighting design calculations and to evaluate lighting

	systems in indoor and/or outdoor spaces and to solve problems concerning lighting design issues – ILO a. to e.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Test	20	✓	✓	✓	✓	✓	
2. Laboratory	10	✓	✓	✓	✓	✓	
3. Lighting design project	15	✓	✓	✓	✓	✓	
4. End-of-semester examination	55	✓	✓	✓	✓	✓	
Total	100						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject assessment takes form of both the coursework evaluation and the examination. Each assessment method is underpinned by the tailor-made assessment rubrics/criteria to evaluate as to whether students have attained the subject outcomes and at what mastery levels.

Continuous Assessment (45%)

1. The in-class test is to assess students' ability in acquiring the knowledge delivered in lectures and tutorials and their achievement of the intended learning outcomes – ILO a. to e.

2. The laboratory work is to assess students' understanding of the visual environment and/or characteristics of lighting systems and components through practical measurements – ILO a. to e.

3. The design project is to assess students' ability in lighting design by selecting suitable lighting systems and components and performing lighting calculations and in analyzing, integrating, synthesizing and evaluating different aspects of lighting principles to solve problems in different lighting designs – ILO a. to e.

Examination (55%)

4. The examination is to assess students' achievement of the intended learning outcomes by solving problems which require them to apply their knowledge of different types of lighting systems and related issues – ILO a. to e.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures	22 Hrs.
	▪ Tutorials	9 Hrs.
	▪ Laboratory	6 Hrs.
	▪ In-class assessment	2 Hrs.
	Other student study effort:	
	▪ Reading and tutorial exercises	27 Hrs.
	▪ Design / case study assignment	27 Hrs.
	▪ Revision for examination	27 Hrs.

	Total student study effort	120 Hrs.
Reading List and References	CIBSE SLL Code for Lighting 2012. CIBSE SLL Lighting Handbook. 2009. IES Lighting Handbook, 10th edition, 2011. Coaton, J.R. and Marsden, A.M. Lamps and Lighting. 4th edition. Arnold, 1997. Simons R.H. and Bean A.R. Lighting Engineering: Applied Calculation Bodrogi P. and Khanh T.Q. Illumination, Color, and Imaging	